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TECHNOLOGY AND THE REDESIGN OF WORK IN THE INSURANCE INDUSTRY

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Abstract

Driven by rapid changes in the financial environment, insurance companies are exploiting the capabilities of computer and information technologies to redesign jobs and reorganize work. Interviews at six major carriers indicate that the redesign of work varies widely within the industry, suggesting that there is considerable latitude in how the technology is utilized. Nevertheless, important trends can be discerned. It is already clear that automation is eliminating not only less-skilled clerical work, but also lower-level professional jobs as the more routine aspects of professional work are automated and folded into clerical jobs. This study examines the implications of these changes for employment levels, job skills, educational requirements and occupational mobility within the insurance industry.

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Financial corporations in the United States are undergoing a rapid transfromation as a result of the convergence of three powerful forces for change: high and volatile interest rates, rapid deregulation, and the diffusion and systematic application of computer and information technologies. The interaction of these forces is presenting financial corporations with the impetus to create new products and to alter the production process. While the consequences of these changes are just emerging, it is already apparent that major adjustments in the work force of the financial sector will be required.

The insurance industry is a case in point. Automation began in this industry around 1960 with the introduction of mainframe computers to handle customer billing and to provide management with detailed and timely accounting data. The carriers established data processing centers physically separated from other insurance operations. Employment of professional and clerical workers increased as these centers were staffed while jobs elsewhere in the firm were largely unaffected. The automation of routine underwriting and rating procedures, which began in the 1970s, also involved the computerization of discrete tasks at first. Some underwriting and rating functions were transformed, but initially automation meant the transfer of codified knowledge from a set of manuals to a computer program. The work process was largely unaffected and, despite the capabilities of the technology, an insurance application continued to pass routinely through five or more hands before policy was issued. Not until the financial environment was radically altered by the doubling of the inflation rate and the associated increase in interest rates in the 1970s did the industry begin to exploit the capabilities of computer and information technologies to develop new products and to experiment with the redesign of jobs and the reorganization of work. Driven by market forces and the capabilities of the new technologies, changes in the work process began in earnest in 1979.

This study investigates the nature of these changes and their implications for the insurance industry work force. As we shall show, the technological transformation of work in this industry has an impact on both the number and kinds of jobs in insurance. The greatest effect is on traditional clerical work. A study recently completd for the U.S. Department of Labor predicts that clerical employment in insurance will decline by at least 22 percent between 1980 and 2000, with most of the reduction occurring after 1990 (Roessner, 1984:26-27). Evidence currently available indicates that it is the women in traditional clerical jobs who face the greatest threat of loss of employment, routinization or "deskilling" of work, and decreased opportunities for occupational mobility (Feldberg and Glenn, 1983). However, changes in the work process as a result of the introduction of office automation technologies do not nearly parallel the fragmentation and deskilling of jobs that was characteristic of the mechanization of production in manufacturing. In contrast to earlier industrial automation, computer and information technologies do not eliminate skilled workers, nor do they reduce average skill levels across broad occupational groups. Instead, less skilled work--both clerical and professional--is being eliminated. Routine keyboarding is diminishing in importance. Skilled clerical work, however, is increasing and the remaining professional jobs require substantial amounts of formal training. The technology thus transforms and downgrades the more routine professional work into clerical tasks. At the same time, however, the skill level of clerical work is rising.

These findings are likely to have application far beyond the insurance industry. Nearly half the U.S. labor force works in an office. "Information workers"--managers, technical/professional, clerical, and sales personnel--currently comprise 53 percent of the labor force. Clerical workers, alone, represent nearly one-fifth of all workers. Office automation and other information technologies are permanently altering the nature of white collar and pink collar work. The insurance industry is on the cutting edge of these developments. The effects of

technology on the nature of work in the insurance industry may very well signal the future direction of change in office work in the U.S. economy.

Approach of the Study

This investigation of adjustments in the insurance industry work force focuses on several important dimensions of change--the effect on the number of jobs, the distribution of occupations, the level of skills, the nature of clerical work, and the opportunities for upward mobility. Two subsidiary issues considered in this paper are the implications of these changes for women workers and for education.

The salient features of both the economic environment and the automation technologies are described in the next two sections. While this is a necessary beginning point for evaluating and forecasting the effects of automation on the work force, it is not sufficient; for the impact of new technology depends fundamentally on the way in which it is implemented.

For this reason, aggregate data available from the U.S. Department of Labor and a careful study of the specialized literatures on the various segments of the insurance industry as well as on office automation were supplemented with on-site visits and interviews at a small number of insurance carriers and agencies. Executives responsible for the implementation of new technology and for the design (or redesign) of jobs were interviewed. The Vice President for Human Resource Development was interviewed at every carrier and, where appropriate, The Vice President for Technical Systems was interviewed as well. At one carrier, in which automation of the sales force was the major technological priority, the Assistant Vice President for Personal Lines Marketing charged with developing the software and training the agents was also interviewd. Inteviews at agencies were conducted with the President of the agency as well as with agents and clerical staff.

In all, interviews were conducted at six carriers and two independent agencies. Two of the carriers are in the life/health segment of the industry, three are in the property/casualty segment, and one

sells the personal lines (life, health, auto, homeowner's, accident) as well as group health. Four of the companies sell their products through independent agents, one has a captive agency sales force, and one is a direct writer using mail, television and other forms of direct solicitation to sell its products without a sales force. Assets at the carriers varied from $60 billion down to $0.2 billion. The sample, while small, is representative of the range of firms in the industry. These interviews, together with aggregate employment data and published descriptions of the technologies provide the basis for the remaining sections of the paper.

The Economic and Technological Forces for Change

Economic Environment

Interest rates doubled over the decade of the 1960s and nearly doubled again in the 1970s, reaching double digit levels by the end of the decade. Financial markets encountered difficulty performing well in these circumstances. Rising and increasingly volatile interest rates fueled a wave of financial innovation and deregulation as financial institutions sought to develop strategies for coping with the economic environment. "Financial institutions pushed out in all directions, and financial practices became highly flexible as financial deregulation proliferated both in fact and in formal law" (Sametz, 1984:8). Competition developed among large financial institutions whose functions and operations had been segregated by law since the 1930s.

Rising interest rates had a marked effect on the insurance industry, which depends primarily upon investment returns, not underwriting, for its overall profit. Traditionally, insurance carriers were major participants in the capital markets as they matched the maturities of their portfolios to expected claims. Inflation in the late 1970s turned yields on long terms assets negative, however, and encouraged insurance companies to find ways amoung regulatory standards on investment. Turbulence in financial markets increased the risks involved but also raised the possibility of large pay-offs for carriers whose investment

managers outperformed the market. The large cash flow characteristic of the industry, and the possibility of high returns, attracted new entrants. Increased competition in all segments of the industry drove down the price of insurance. Average premiums per $1000 of coverage dropped sharply.

While the late 1970s were a period of high profits for property and casualty firms, following the initial adjustment to an inflationary regime, competition dangerously narrowed the margin between premium income and the cost of writing policies on commercial risks and also eroded the market share of some established carriers. Carriers turned to technology to reduce costs and to improve margins and regain market position.

Adjustment to inflation for carriers in the life and health segment of the industry was more difficult. Whole life, the industry's predominant product, combines insurance with a savings plan yielding a 4 to 6 percent return. With interest rates on competing savings instruments rising, the ability of life insurance products to attract savings declined. Sales of term insurane increased, but since term is much cheaper than whole life, premiums stagnated. Life insurance companies were under pressure to develop new products.

Variable annuities were developed during the 1960s. Variable life was proposed in 1972 and approved by the Security and Exchange Commission in 1976. Both are based on a portfolio of common stock and pay benefits that are not guaranteed but are contingent on the actual performance of the portfolio. Universal life, introduced in 1979, splits the premium and allows the consumer to decide how much goes to the death benefit and how much to savings. As with variable life, the premiums are placed in separate accounts and invested in securities whose returns are more sensitive to market rates of interest. Not until 1983, when carriers began providing their sales force with computers and software capable of calculating death benefits and cash value under a variety of interest rate projections and with the premium split in different ways, did these so-called "new wave" policies become significant. Universal life

accounted for 18 percent of new premium income last year (Business Week, 25 June 1984:61). Life insurance companies have had to upgrade their computer systems and retrain their sales forces in order to sell these products. Moreover, competition from financial supermarkets not dependent on agents who collect commissions had created pressure on life insurance companies to use technology to upgrade the productivity of their traditional distribution system.

Office and Information Technologies

The production process in the insurance industry was rationalized decades before the introduction of office automation. Jobs were fragmented and functionally specialized, and paper wended its way around the office floor as surely as if it were on an assembly line. Introduction of the mainframe computer into the industry in the 1960s left this process largely untouched.

Computers at first were used to process routine or repetitive transactions. Mainly, they were used to keep track of and process all premium transactions. Claims disbursements were also automated early. In addition, the computer was used from the beginning to generate the numerous reports needed by the accounting department. Separate electronic data processing departments were establisehd. The resulting growth of computer specialists and operations research personnel contributed to the increase in professional employees during the 1960s while keypunch operators and computer operators increased the number of clerical workers.

In the 1970s the capabilities of the central computer were used to support the underwriting aspects of the insurance business. The technology allowed underwriters at field or central offices to accept applications. If accepted, the application would undergo overnight processing by the computer, which would also calculate the premium. The output would then be mailed from central processing to the field office or printed via remote printer. In addition to processing applications, the computer could generate activity reports for field offices.

To implement the technology, programmers translated the manual processing procedures into programs. Decision algorithms were incorporated into the programs, systematizing the decision-making process for underwriters. In the early period, underwriting rarely requires decisions that are not machine generated, and the computerization of underwriting for small or routine commercial risks is proceeding. At some carriers low level underwriting functions have been assigned to newly created clerical positions. Moreover, as underwriting jobs have been systematized, women have been hired into them.

Access to computer programs for underwriters is provided through telephone lines and CRTs. Initially, use of this technology required substantial clerical staff to code information and type attachments as well as to assemble and mail out the policy packages. Currently, policies are entered on-line as they are issued, and word processing handles the attachments. Routine keyboarding is declining.

Electronic typewriters and word-processing equipment spread rapidly in insurance offices in the 1970s. Electronic sorting of incoming mail, document control, electronic filing, and electronic mail are other important technologies in use in insurance. On-line processing of policies and optical character recognition techniques adopted over the last decade have reduced the need to code information onto worksheets and to keypunch it into the computer. Substantial savings in labor time in routine clerical work has already been achieved.

The next stage of office automation is integrated information processing, in which components that do word and data processing are linked through high speed communications networks. These systems are used to support both clerical and decision-making functions. Important problems have slowed the adoption of this technology in insurance offices. These include high cost, the expectation of future improvements, and unresolved questions of access to and responsibility for central files.

Software is currently being developed to provide the on-line data and information services essential for middle and senior management and

for professional staff. There are two aspects to the required technology--an appropriate data base and data base technology, and terminals or small computers capable of transparent interface with the central computer, other terminals and a variety of peripherals. Data base management systems are now in the process of development and implementation. Since the batch oriented accounting support systems already in place do not lend themselves readily to the demands of the decision support system, firms face difficult and expensive choices. The technology is expected to improve the performance of managers, but it has run into difficulty being accepted. The issue is not reluctance to use a keyboard per se, but more general complaints about access methodology. Managers complain that with existing keyboard menu-based systems, the personal time and effort required to get into the system are too great in terms of what can be gotten out of it. For the present, professional support staff are increasing as some companies establish separate programming staff responsive to the needs of managers.

Cost-effective software services are being made available to property claim departments. These include computerization of automobile and property claim estimates as well as damageability and management report information. Computerization does not yet extend much beyond auto though other personal lines and worker's compensation claims are being automated. Computerization automatically captures all estimate information without duplicate keypunching. Data can then be summarized into management reports and used to improve the efficiency of the claims management operation. Linking the claims data base to other data bases will also allow insurers to predict claim frequency and to estimate loss ratios.

Carriers are actively engaged in automating the sales force. Although some agencies have used minicomputers for several years, the cost proved difficult for most to justify. Originally it was believed that the expense of computerizing agencies would not be warranted without interface between agents and carriers. In the last year, however, the carriers have recognized the importance of computerization in improving

the productivity of agents. Moreover, new wave life policies can't be marketed without the high speed calculating capability of the computer. As a result, some carriers are currently helping their high volume agents obtain sophisticated equipment and specialized software, either providing them outright or subsidizing their purchase. The computer is used mainly to prepare sales proposals or to expand and focus marketing efforts. A few carriers have established interface with a small number of high volume agents, enabling them to underwrite, rate and issue policies directly. Independent agencies that do not produce a high enough volume of business to warrant computerization by the carrier have established a common network to interface with agencies that have this capability.

Technologically advanced firms have targeted the distribution system and the management function for cost-cutting via technology during the remainder of the decade. Interest in networks that allow otherwise noncompatible machines to interact is high, but implementation of the paperless electronic office is a low priority for most carriers.

Changing Jobs, Skills, and Career Ladders

An important insight that has emerged after several years of experience with office technologies is that the technologies used to automate clerical, underwriting and processing functions differ fundamentally from older industrial technologies. The management of office automation must likewise differ. The logic of scientific management in a factory setting meant that work was rationalized and fragmented as it was automated. Productivity increased, but in the process worker skills were devalued, tasks became repetitive, and a sense of responsibility for the company's product was diminished. When automation was first introduced into an office environment, the same logic prevailed. In the insurance industry, where work had long since been fragmented, computerization was applied to discrete tasks. Skill levels tended to decline and the automated tasks were routine and repetitive.

As experience with office automation increases, however, it appears that in contrast to earlier factory automation computer and communication technologies are often most effective in reducing costs when control, communication and decision making are decentralized and when hierarchic organization and the functional specialization of tasks are reduced. Recent applications of these technologies have involved the elimination of both low skill clerical and routine technical and professional jobs, and the creation of new, multiactivity, skilled clerical positions to handle these functions. A less common alternative is to broaden the agent's job by folding routine underwriting and rating functions into it and providing for the printing and issuing of policies at the point of sale. The result has been a significant reduction in unit labor requirements and an increase in the average skill levels of the remaining clerical, sales and professional work force. The following examples illustrate these changes.

In the property and casualty segment of the industry, competition has driven down premiums on small or unexceptional commercial risks--condominiums, stores, commercial auto, worker's compensation--despite rising costs, substantilly reducing the profitability of these lines. One major insurer has developed a strategy that reduces the costs of processing an application and improves the efficiency of its distribution network. The carrier is developing computer programs that assist in underwriting and rating of these commercial lines, and agents are being trained to use these programs. The carrier is providing its highest volume and most professional agents (about 10 percent of its sales force) with intelligent terminals linked to its central computer. The terminals are also linked to printers capable of issuing a policy at the point of sale. When the procedures are fully implemented, all clerical processing will be eliminated for sales generated by these agents. Policy typist, rater, and underwriter's assistant--jobs which provided career paths from clerical to lower level professional jobs as underwriters--are disappearing. In fact, the lower level jobs as insurance professionals are rapidly declining as well.

Jobs for the most skilled underwriters remain, but the jobs have changed. Skilled underwriters no longer manage risk, they manage agents. They oversee the agent's "book of business"--assessing the agent's success at underwriting, offering advice, developing customer profiles, focusing marketing efforts, assuring the professionalism of the agency--and encouraging the agent to do a volume of business that warrants the carrier's investment. A few of the displaced clerical workers are being retrained and given basic programming and trouble-shooting skills in order to provide technical support to agents using computer terminals. But most of the traditional clerical and professional functions in accepting or rejecting an application and in issuing a policy will be performed by the agent.

A very different example is provided by the carrier that sells personal lines insurance, standardized products that can be mass marketed without agents through direct mail and television solicitation. Direct writers, as they are called, are the most profitable and most rapidly growing carriers. New companies have entered this market, undercutting existing firms and causing wide swings in market share. One established company, which experienced a sudden drop in market share in 1980 had previously automated mail handling and filing, thus eliminating nearly all unskilled clerical jobs. Policies were entered on-line and the system could handle inquiries for current information about coverage immediately. The work process was extremely fragmented, however, to the extent that customer inquiries were answered by different people with different job titles depending on whether they came by mail or telephone. The first step taken when business declined was to integrate some of the tasks to facilitate reductions in staff. This first round of integration made no use of computer technology. But by 1983, information technologies had been used to create multiactivity jobs in the operations area that were highly integrated. Since the company's products were standardized, underwriting and rating functions were entirely computerized and the jobs eliminated. Instead of these positions, a new highly skilled clerical position has been designed. Customer service

representatives handle sales, access the computer program that assesses risk, access the rating program, explain rating procedures to customers, answer customer questions and respond to complaints by telephone or mail.

Thus the company responded to the loss of business and the need to "skinny down" by a change in job design. Success is apparent in the fact that by 1983 the company was again doing its 1979 volume of business, but with half the number of employees.

Job redesign has included both the integration of tasks into multidimensional jobs and the elimination of the lowest level clerical and less skilled professional jobs. The resulting configuration of jobs varies from firm to firm, but in every case job categories have become more abruptly segmented while the avenues of mobility between them have been sharply reduced. Many of the newly created jobs are characterized by few opportunities for the exercise of judgment and increased managerial control over the pace and content of work as compared with the profesional jobs they replace. Yet, these very jobs are less fragmented, less centralized, involve considerable training, and often require significant knowledge of the product.

The effects of automation on skills in the insurance industry vary from carrier to carrier. It can be said, however, that the new techniques do not eliminate skilled workers nor do they reduce required skills to the barest minimum. The clerical jobs that remain fall into two categories--routine keyboarding (text or data entry, accessing of underwriting and rating programs) and skilled activities (customer service representative, claims representative, secretary). Routine keyboarding is decreasing in importance as office technology continues to advance and as work is reorganized so that sales are entered online. Skilled clerical work continues to increase, however, as the more routine aspects of professional work are automated and become part of the clerical function. The requirements for skilled clerical work are high general literacy skills, good verbal communications skills and an aptitude for arithmetic, but no specific business or insurance skills. The remaining professional jobs--exceptions or special risks

underwriters, lawyers, electronic data processing professionals, actuaries, financial managers--require years of formal training in insurance or other disciplines. As a result of the automation of underwriting and claims estimating for standardized insurance products, career ladders from skilled clerical to insurance professional positions have been eliminated. The gap between the skills of clerical workers and those of professionals has widened despite the elimination of unskilled clerical work such as coding and sorting mail and much filing, and the reduction of routine keyboarding. Skill requirements for clerical workers have increased at the same time that the jobs have become overwhelmingly dead-end.

The effect has been to eliminate a range of middle level jobs within this industry and to close off avenues of upward mobility for those in clerical occupations. Male clerical workers always had opportunities for advancement to insurance professional and managerial positions. But until the 1970s women were prevented from advancing by the sex segregation of occupations--underwriters, managers and even clerical supervisors and office managers were usually men. Today, partly as the result of successful affirmative action suits against several carriers, sex is a much less effective barrier to mobility. Now it appears that newly-opened avenues of advancement from clerical work to professional jobs are being blocked by new structural barriers--the elimination of less skilled professional positions. While the more routine kinds of underwriting are being computerized, credentials for entry into commercial lines and special risk underwriting are increasing. They often include a college degree plus the requirement that the employee obtain professional certification. The gap between the skills required in skilled clerical work and those required in the remaining insurance professional and professional staff positions appears to be unbridgeable in the context of how work is currently being organized. Avenues of mobility which have only recently opened up for women clerical workers are already disappearing.

Thus the introduction of microprocessor-based technologies and the dramatic redesign of jobs is altering the distribution of occupations in insurance. Office automation has wiped out thousands of jobs for low-skilled clerical workers, created new jobs for skilled clerical workers, and eliminated many professional jobs that comprised the middle of the occupational distribution--and that used to constitute the rungs of a career ladder by which clerical workers could climb up into more highly skilled professional jobs. Declines in unskilled clerical jobs have limited the entry-level job opportunities for minority and working class women. What is more, the opportunities for advancement by even the more highly skilled clerical workers are being closed. The bottom and the middle of the occupational distribution are both shrinking in the insurance industry.

Changes in Employment and Occupations

The introduction of automation in the 1960s, characterized by the use of mainframe computers, did not discourage employment growth at carriers. Property and casualty firms experienced average annual employment growth of 2.7 percent through the decade (Table 1). Job growth was paced by rapid increases in the numbers of professional, technical, and clerical workers (Table 2).

Not until the 1970s--when the costs of mail-sorting and word-processing equipment dropped, optical character recognition technology became available, and software to automate most personal lines rating and underwriting was developed--did automation slow the growth of employment. The slowdown was most apparent in the life and health segment of the industry which deals entirely in personal lines. Employment growth in this segment averaged 0.9 percent per year. In contrast, employment growth at property and casualty carriers, whose business is dominated by commercial risks that are only now being automated, averaged 3.2 percent per year between 1970 and 1978. It slowed to 1.7 percent in the last years of the decade as automation of office clerical and professional work accelerated.

While employment of raters and underwriters is not reported in the National Industry-Occupation Matrix, their numbers appear to have declined. This may have been offset to some extent between 1970 and 1978 by the 120 percent increase in computer operators, a category that includes operators of peripheral equipment such as CRTs (Table 2). The spread of word-processing equipment and electronic dictating machines is reflected in declines in the absolute numbers of typists and stenographers. The effects of increased on-line processing can be seen in decreases in the numbers of keypunch operators and file clerks. Data for the 1978-1981 period are available, though they are not strictly comparable with figures cited in Table 2 (U.S. Department of Labor, n.d.). The trends reported in these data are consistent with those reported for the earlier period. Most clerical categories show a relative decline (i.e., in employment share), while some occupations registered absolute declines. These include manual bookkeeping clerks, correspondence clerks, file clerks and raters as well as typists and stenographers.

Two recent studies look ahead to the years 1990 and 2000 and examine the effect of office automation on employment (Roessner, 11984; Leontief and Duchin, 1984). Roessner is concerned with the effects of automation on clerical employment in insurance and banking. His study identifies several "breakthrough" technologies with the potential to reshape clerical work, examines their impact on a matrix of clerical tasks and functions, and concludes that the most likely time path for clerical employment in insurance is "flat clerical employment through about 1990, then a decline in employment by 2000 to 61 percent of the 1980 level, or from 924,000 to 568,000 employees....At minimum, we foresee <u>absolute</u> reductions in clerical employment of 22% in insurance...by 2000" (Roessner, 1984:26-27).

Leontief and Duchin examine the automation of office operations in business enterprises generally. They consider two scenarios, the more modest of which assumes slower adoption of computer-based work stations and integrated electronic systems. Since integrated electronic systems

("paperless offices") are expected to be slow in penetrating the insurance industry in this decade, this scenario is of greater interest. In this scenario Leontief and Duchin conclude that the number of stenographers, typists and secretaries required to produce the ouput of 1977 with the technology of 1990 will be 85 percent of the 1977 number. For office machine operators it will be 45 percent and for other clerical workers it will be 88 percent. By 2000 the proportions will fall to 76, 15 and 74 percent respectively. While labor requirements per unit of output are falling, the labor force and demand for output are both growing over time. Weighing reductions in unit labor requirements against growth in production, Leontief and Duchin conclude that office employment in the U.S. economy will continue to grow, though they do not report results for particular industries such as insurance.

The interviews I conducted with insurance executives suggest that Roesnner's conclusion that there will be substantial drops in insurance industry employment is correct. For example, the carrier described earlier had already eliminated most mail handling and filing jobs through automation of these functions when it faced a sudden $23 million dollar decline in business. In 1979, the year before it lost this major contract, it employed approximately 5,000 people. By 1981, the company was down to 2,700 people. Today, the company does a dollar volume of business that exceeds the 1979 level with only 3,000 employees, an employment drop of 40 percent.

Roessner's analysis and findings, however, are focused too narrowly on traditional clerical employment. Cost-cutting strategies at insurance carriers rely heavily on eliminating professional jobs by standardizing more routine professional functions and turning them into skilled clerical work. Thus, some part of the decline in traditional clerical jobs which he identifies may be offset by the creation of new clerical functions. In addition, many carriers expect a shake-out in insurance agencies in which only the larger, more professional ones survive. They anticipate a leaner sales force with fewer agents writing a larger volume of business as automation proceeds.

Finally, the carriers anticipate slow growth or a decline in management ranks. Excessive growth in management and supervisory pesonnel characterized both the life and health and property and casualty segments of the industry between 1970 and 1978. Reasons for this vary. Some firms, locked into compensation schemes geared to low inflation rates, promoted employees to raise salaries when inflation exploded. Others quietly used "title inflation" to achieve affirmative action promotion goals. Some firms rewarded their professional staff with managerial designations. By 1982 many carriers had succeeded in breaking this promotion cycle. In addition, most carriers set increases in white collar productivity and the elimination of redundant management ranks as high priorities. The Leontief and Duchin study estimates that increases in productivity of managers as a result of automation, even in the more modest scenario, will allow the 1977 volume of work to be done with 99 percent of the 1977 managers in 1990 and 88 percent by 2000.

Implications for Women and for Education

Shifts in the occupational distribution in the insurance industry have important implications for employment opportunities for women. Women comprise virtually 100 percent of the employees in clerical occupations in which employment has declined. Because of the high turnover rates in clerical jobs in insurance, reductions in staff were accomplished largely through attrition. Nevertheless, traditional clerical jobs for which non-college bound women frequently train while in high school declined by a total of 28,556 positions between 1970 and 1978. At the same time, skilled clerical positions are being penetrated by women and new skilled clerical jobs are being created. Thus, women insurance adjustors, examiners and investigators (occupations which are classified as clerical) were 9 percent of the total in 1971, and 58 percent of the total in 1981 (U.S. Department of Labor, 1982). Employment in these occupations increased more than 58,000 between 1970 and 1978, while percent female nearly doubled. As a result, the number of women holding such jobs increased by approximatley 56,000. Thus the

feminization of insurance adjustor, examiner, and investigator occupations more than offset the decliens in traditionally female clerical jobs before 1978. These jobs will be affected, however, as the automation of claims procedures progresses.

As a result of both the technological dynamic and the penetration by women of male occupations, the skills required of women clerical workers are rising. Insurance companies have adopted several strategies for hiring women with the appropriate skills. These include moving the work from central cities to small towns, suburbs and rural areas where the work force is mostly white and pay for women is lower. A second strategy firms have followed is to hire college graduates for career clerical positions. While clerical work does not require any specific skills learned in college, including computer courses since the level of computer literacy required in clerical jobs is easily mastered, college graduates are hired to ensure that general literacy and problem-solving requirements of the jobs will be met.

Minority women have only recently penetrated clerical work and are still found mainly in the less skilled clerical jobs. Thus automation is eliminating precisely those jobs in which black women are present in significant numbers. The movement of clerical work to small towns and suburbs and the increased hiring of college educated women for these jobs also limits opportunities for black women. These developments have a similar negative impact on employment possibilities for less educated urban white working class women as well.

The issue of upward mobility is also an important consideration. As argued above, job categories have become more segmented. The gap between skilled clerical and professional employees has grown larger, and jobs that constituted the career path from clerical to professional work have largely been eliminated. This does not mean that professional, technical, sales and lower level management jobs are likely to become entirely male again. On the contrary, jobs for college educated women professionals, and to a lesser extent managers, continue to open up. Women increased from 10 percent of insurance agents, brokers and

underwriters in 1962 to 12 percent in 1971 and 24 percent in 1981 (U.S. Department of Labor, 1982). This is reflected in the employment growth of women in the agencies/brokers segment of the industry (Table 3), though most of these jobs of course are clerical. Non-clerical jobs, it appears, will continue to desegregate. The on-going recruitment of women as computer programmers, marketing managers, and underwriters is seen by the carriers as obviating the need for promotion from clerical to professional or managerial ranks to provide women with opportunities.

Men continue to dominate those departments from which the carriers choose their top managers and executives--finance, marketing, investment, and actuary. But women have been entering professional and lower managerial ranks and can be expected to continue doing so. Some of the specialized occupations within these categories may become majority female since educated women can be hired more cheaply than similarly qualified men. The result could be lower pay and lower status in those jobs, with the work devalued because it is done by women.

The occupational structure for women in the insurance industry is becoming increasingly two-tiered. It has been observed that the occupational hierarchy is not as gender segregated as in the past, but occupational stratification occurs increasingly along class and race lines (Baran and Teegarden, 1983). Educated white women with the appropriate credentials and class background enter the upper tier as jobs there continue to desegregate. The vast majority of women in insurance, however, are relegated to totally segregated clerical jobs. Technology is eliminating the least skilled of these, but literate clerical workers, especially if they're white, will find their situation essentially unchanged.

Implications for Education

The combined effects of technology and changes in the economy are placing new demands on the U.S. educational system. As exemplified by the insurance industry, office automation has raised skill requirements for clerical workers. Employers have made it clear that they want high

schools to provide a strong foundation in reading, math, written and verbal communication and problem-solving skills. Computer literacy is viewed as a less pressing reuirement since the computer skills required by non-specialists can be acquired through company training by workers who have reading and problem-solving capabilities.

Thus automation is blurring the distinction between vocational or commercial education and academic education in secondary schools as new technology increases the importance of reading and analytical skills for clerical workers. With job content changing as automation progresses employers want, and workers require, broad occupational preparation as well as specific technology-related vocational skills. A broad education is essential because it increases individual career choices, provides a foundation for learning new skills, and allows an individual to adjust effectively to a job change or a change in the work environment. These are qualities which workers need in order to deal with likely future changes in skill requirements in office industries.

Specific vocational skills related to current office technologies which are useful for business students are word processing, data processing, electronic mail and electronic records management. It should be noted, however, that the insurance industry has a long history of providing company and industry sponsored training programs to teach specific vocational skills (including word processing, telephone speaking skills, even BASIC) as well as insurance concepts and procedures to workers who require them. As unskilled clerical and routine keyboarding jobs decline, the proportion of workers requiring such training is increasing. Carriers are stepping up their training and retraining programs, and industry-wide educational organizations are responding by developing new courses. Employers' primary concern, therefore, is with hiring workers who will be successful in these training and elducational programs and for whom training costs can be kept to a minimum.

Women need college degrees to enter professional jobs now that the jobs that constituted internal career ladders are declining.

Opportunities for college education need to be made more generally available. Inner city high schools need the resources to prepare students for entrance into degree programs. Otherwise the desegregation of occupations by gender will mask an equally invidious exclusion of inner city women, especially black women, from these jobs.

The need for increased emphasis on training in mathematics for women is also apparent. Arithmetic as well as problem solving and analytical skills are necessary in both clerical and professional jobs. Moreover, women need advanced training in mathematics in order to enter top professions (for example, actuary, operations research or financial manager in insurance) from which the upper ranks of corporate management are often filled.

By shifting the occupational distribution toward skilled clerical and highly trained professional jobs, office automation is challenging the educational system to design instructional programs that provide a sound foundation in basic skills for all students and that prepare high school graduates for a lifetime of continuing education, either in college, other post-secondary schools or industry-based instructional programs. The educational establishment is also being asked to develop programs to meet the newly emerging lifelong need for education for those in the labor force.

Conclusions

Automation is changing job opportunities in the insurance industry. It has already eliminated thousands of traditional clerical jobs--for file clerks, data entry clerks, typists, bookkeepers, stenographers and mail handlers. The diffusion of existing office and information technologies are expected to cause further declines in these occupations and to reduce the employment of key punch operators, office machine operators and word processing personnel as well. Recent studies of clerical work suggest that by 2000 it will be possible to produce the 1977 volume of output with less than 75 percent of 1977 clerical employment. One study predicts an <u>absolute</u> reduction in clerical

employment in insurance of at least 22 percent, with a 39 percent reduction most likely. The executives I interviewed expect substantial reductions in unit labor requirements and actual declines in employment during the 1980s except for those firms able to increase market share. For the industry as a whole, declines in the absolute level of employment in line with Roessner's projections are anticipated.

In addition, the work process itself is being transformed by technology. Although the redesign of jobs varies widely among insurance firms, the elimination of less skilled clerical jobs and the reorganization and downgrading of more routine professional work are characteristic of the on-going changes. New skilled clerical jobs such as underwriter's assistant and customer service representative, as well as the upgrading of existing positions such as claims representative, have emerged as a result of automation. These jobs offer less in terms of pay, prestige, decision-making and advancement than the professional jobs they replace. But they also represent an upgrading of skill requirements and, to a lesser extent of pay, for clerical work. Skill levels in clerical jobs, and in the remaining professional jobs as well are rising.

Opportunities for upward mobility for clerical workers who want to move from skilled clerical to professional positions, however, have been sharply curtailed. The insurance industry has only recently begun to establish career clerical positions--skilled but dead-end clerical jobs.

This has happened as the routine aspects of professional work have been automated and folded into clerical jobs, and lower level professional jobs have been eliminated. These jobs used to comprise a career ladder for clericl workers. Declines in unskilled clerical jobs have limited the entry-level job opportunities for minority and working class women while opportunities for advancement by even skilled clerical workers are also being closed.

In these circumstances, the role of the educational system in preparing women, who are 61 percent of this industry's current labor force and who comprise nearly 100 percent of the workers in traditional clerical jobs most affected by automation, for the remaining employment

opportunities is a key one. Women must be college educated in order to compete for the remaining professional jobs. They must be literate with good communication and problem-solving skills to compete for skilled clerical jobs. Failure to improve the quality of inner city schools will close off clerical employment for minority and white working class women.

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TABLE 1

Insurance Industry Employment,[a] Selected Years

Year (annual average)	Property/ Casualty	Life/ Health	Agencies/ Brokers	Total Insurance
1960	288,700	502,500	207,200	1,008,600
1970	365,800	619,500	288,000	1,273,300
1978	460,600	661,400	392,800	1,514,800
1980	490,500	680,500	454,100	1,625,100
1981	484,400	679,600	457,500	1,621,500
1982	472,100	680,900	475,500	1,628,500

Percent Change in Employment (annual average)

Period	Property/ Casualty	Life/ Health	Agencies/ Brokers	Total Insurance
1960-1970	2.7	2.3	3.9	2.6
1970-1978	3.2	0.9	4.6	2.4
1978-1981	1.7	0.9	5.5	2.5
1980-1982	-1.9	0.0	2.9	0.1

[a] Does not include insurance industry labor force employed in real estate offices, stock brokerage houses, etc. (approximately 6 percent of the industry labor force, but increasing).

Source: U.S. Department of Labor, Employment and Earnings, United States, 1909-1978; U.S. Department of Labor, Employment and Earnings, Table B-2, March issue, various years.

TABLE 2

Insurance Industry Employment by Selected Occupations: 1960, 1970, 1978 and Projected 1990

Occupation	1960 Number	1960 Percent	1970 Number	1970 Percent	1978 Number	1978 Percent	1990 Number	1990 Percen
MANAGERS/OFFICERS	144,000	13.3	160,011	11.8	194,200	12.1	289,663	14.8
PROF/TECH WORKERS	34,700	3.2	77,773	5.8	96,468	6.0	108,487	5.5
Accountant			24,188	1.8	28,805	1.8	39,762	2.0
Systems Analyst			3,833	0.3	5,514	0.3	5,514	0.3
Programmer			11,078	0.8	12,388	0.8	11,580	0.6
CLERICAL WORKERS	512,000	47.4	675,427	50.0	730,242	45.4	869,847	44.3
Computer Operator			9,751	0.7	21,374	1.3	20,640	1.1
Keypunch Operator			24,026	1.8	18,763	1.2	12,278	0.6
Statistical Clerk			37,799	2.8	40,214	2.5	40,153	2.1
Bookkeeper			48,099	3.6	44,549	2.8	36,611	1.9
Adjustor, Examiner			99,082	7.3	157,354	9.8	227,506	11.6
File Clerk			34,185	2.5	27,440	1.7	31,021	1.6
Mail Handler			9,334	0.7	8,332	0.5	5,947	0.3
Secretary			178,161	13.2	192,853	12.0	275,433	14.0
Typist			92,472	6.9	81,661	5.1	95,306	4.9
Clerical Supervisor			15,134	1.1	16,739	1.0	16,702	0.9
SALES	363,000	33.6	404,846	30.0	555,408	34.5	663,667	33.8
Agents, Brokers			403,700	29.9	554,083	34.4	662,828	33.8
OTHER	29,650	2.7	32,844	2.5	31,488	1.9	30,682	1.6

Source: U.S. Department of Labor, Bureau of Labor Statistics: Tomorrow's Manpower Needs, Vol. II, "National Trends and Outlook: Industry Employment and Occupational Structure," Bulletin #1606 (1969); The National Industry-Occupation Employment Matrix, 1970, 1978 and Projected 1990, Vol. I, Bulletin #2086 (1981).

TABLE 3

Employment of Women in the Insurance Industry, Selected Years
(in thousands)

Year (annual average)	Property/Casualty		Life/Health		Agencies/Brokers		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1960	165.8	57.4	252.7	50.3	112.2	54.1	530.7	52.6
1970	207.8	56.8	314.7	50.8	158.8	55.1	681.3	53.5
1978	283.4	61.5	371.6	56.2	239.1	60.9	894.1	59.0
1980	308.8	63.0	396.9	58.3	282.1	62.1	987.8	60.8
1982	294.0	62.1	401.3	58.9	301.4	63.4	996.7	61.2

Source: U.S. Department of Labor, Employment and Earnings, United States, 1909-1978; U.S. Department of Labor, Employment and Earnings, Tables B-2 and B-3, March issue, various years.